

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re Application of:	)	
	)	
<b>Gerritsen et al.</b>	)	
	)	
Serial No.: 10/071,405	)	Group Art Unit: 2624
	)	
Filed: February 8, 2002	)	Examiner: Wesley J. Tucker
	)	
For: PROCESSING OF IMAGES IN A	)	<b>Board of Patent Appeals and</b>
DIRECTION OF SUCCESSION	)	<b>Interferences</b>
	)	
Confirmation No.: 1656	)	

Mail Stop: Appeal Brief - Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**REPLY BRIEF UNDER 37 C.F.R. § 41.41**

In response to the corrected Examiner's Answer mailed on June 16, 2009 to the Appeal Brief filed on September 10, 2008, and pursuant to 37 C.F.R. § 41.41, Appellants resubmits this Reply Brief in the above-captioned application.

This is an appeal to the Board of Patent Appeals and Interferences from the Examiner's final rejection of claims 1 and 4-9 in the Final Office Action mailed on April 14, 2008. The appealed claims are set forth in the attached Claims Appendix.

1. Status of the Claims

Claims 2-3 were cancelled. Claims 1 and 4-9 have been rejected in the 4/14/08 Final Office Action. The final rejection of claims 1 and 4-9 is being appealed.

2. Status of Amendments After Final

Prior to the 4/14/08 Final Office Action, all amendments to the claims have been entered. An amendment was filed in response to the 4/14/08 Final Office Action which included an amendment to claim 8. The Examiner indicated on the contents page of the 7/2/08 Advisory Action that the amendment “will be entered” for purposes of the appeal. Appellants respectfully resubmit that the entering of the amendments was relied upon to not be required to address the 35 U.S.C. § 101 rejection regarding claims 8 and 9 in the Appeal Brief. Furthermore, the Examiner indicated that the 35 U.S.C. § 101 rejection was withdrawn because of the amendment.

Later, the Examiner stated in the Examiner’s Answer that the amendment after final rejection filed on 6/16/08 (*i.e.*, response to 4/14/08 Final Office Action) has not been entered. The Board of Patent Appeals and Interferences returned this application to the Examiner to address among other things, issues with the section **STATUS OF AMENDMENTS**. The Board indicated that “An Advisory Action was mailed on July 2, 2008 notifying the appellant that the **After Final Amendment will be entered**”. The Board further indicates that “**Correction** of the status of amendment(s) filed subsequent to Final rejection is required.”

In response to the Board’s request for **Correction**, the Examiner issued a Corrected Examiner’s Answer mailed June 16, 2009, in which the Examiner only responded that “[T]he appellant’s statement...is incorrect” and that “[T]he amendment...had not been entered”. The Examiner did not address the fact that the Advisory Action of July 2, 2008 notified the appellant that the After Final amendment would be entered. While the After Final amendment may not have been entered by some mistake of the Office, the Examiner’s response that “the After Final amendment was not entered” does not alleviate or address the mistake. If the Examiner indicated that the After Final amendment would be entered, then the Examiner needs to execute whatever steps necessary to facilitate entry of the After Final amendment and report said entry accurately.

Thus, it is respectfully submitted that the Appellants' statement of the status of amendments after final rejection contained in the Appeal Brief is correct and that the Office has failed to make the necessary corrections requested by the Board.

3. Grounds of Rejection to be Reviewed on Appeal

- I. Whether claim 7 is unpatentable under 35 U.S.C. § 101 as being directed toward non-statutory subject matter.
- II. Whether claim 7 is unpatentable under 35 U.S.C. § 112, first and second paragraphs, as attempting to define a product entirely by virtue of its function.
- III. Whether claims 1, 4, and 7-9 are unpatentable under 35 U.S.C. § 102(b) over U.S. Pat. No. 5,825,908 to Pieper et al. (hereinafter "Pieper").
- IV. Whether claims 5 and 6 are unpatentable under 35 U.S.C. § 103(a) over Pieper in view of U.S. Pat. No. 5,457,754 to Han et al. (hereinafter "Han").

4. Argument

I. The Rejection Of Claim 7 As Being Unpatentable Under 35 U.S.C. § 101 Should Be Reversed.

A. The Examiner's Rejection

In the Examiner's Answer, the Examiner presented a new ground of rejection for claim 7 under 35 U.S.C. § 101 for being directed toward non-statutory subject matter. (See 12/10/08 Examiner's Answer, p. 4).

B. Claim 7 Recites an Electronic Signal Representative of a Physical Object, Thereby Rendering Claim 7 Patentable Subject Matter.

Appellants direct the Board's attention to the recent Federal Circuit opinion *In re Bilski* (hereinafter "Bilski"). (See In re Bilski, Appeal No. 2007-1130, Fed. Cir. Oct. 30, 2008). Specifically, Appellants direct the Board's attention to the following excerpt from the Bilski opinion:

**We hold that the Applicants' process as claimed does not transform any article to a different state or thing. Purported transformations or manipulations simply of public or private legal obligations or relationships, business risks, or other such abstractions cannot meet the test because they are not physical objects or substances, and they are not representative of physical objects or substances.** Applicants' process at most incorporates only such ineligible transformations. See Appellants' Br. at 11 ("[The claimed process] transforms the relationships between the commodity provider, the consumers and market participants..."). As discussed earlier, the process as claimed encompasses the exchange of only options, which are simply legal rights to purchase some commodity at a given price in a given time period. See J.A. at 86-87. The claim only refers to "transactions" involving the exchange of these legal rights at a "fixed rate corresponding to a risk position." See '892 application cl.1. **Thus, claim 1 does not involve the transformation of any physical object or substance, or an electronic signal representative of any physical object or substance.** Given its admitted failure to meet the machine implementation part of the test as well, the claim entirely fails the machine-or-transformation test and is not drawn to patent-eligible subject matter. (See Bilski). (Emphasis added).

While the Examiner states that the current position of the PTO is that patent-eligible subject matter must be tied to another statutory class or transform underlying subject matter to different state or thing, it is important to note the Federal Circuit's inclusion of "an

electronic signal representative of any physical object or substance” within its description of patent-eligible subject matter. (See Id.). One skilled in the art would understand that an image of an object such as for cardiological applications is an electronic signal representative of a physical object, namely, the object itself. The specification provides the example of the ventricles of the heart, the myocardium (the heart muscle), etc. (See, Specification, Abstract, paragraph [0017]). Accordingly, the process of transforming this electronic signal representative of an object would clearly fit within the Federal Circuit’s description of patent-eligible subject matter, as detailed in the Bilski opinion. Therefore, claim 7 performs a transformation of electronic signal representative of subject matter. Thus, it is respectfully submitted that claim 7 is directed to patentable subject matter and the Board should overturn the Examiner’s rejection.

II. The Rejection Of Claim 7 As Being Unpatentable Under 35 U.S.C. § 112, First and Second Paragraphs, Should Be Reversed.

A. The Examiner’s Rejection

In the Examiner’s Answer, the Examiner presented a new ground of rejection for claim 7 under 35 U.S.C. § 112, first and second paragraphs, for attempting to define a product entirely by virtue of its function, in the absence of any recited structure. (See 12/10/08 Examiner’s Answer, p. 6).

B. Claim 7 Recites an Electronic Signal Representative of a Physical Object, Thereby Rendering Claim 7 to Include More Than Only Function.

The Examiner states that products must distinguish over the prior art in terms of their structure rather than function alone. Thus, the Examiner states that the claim 7 does not “particular point out and distinctly claim...” as no structural limitation is recited. (See 12/10/08 Examiner’s Answer, p. 6). However, in view of the arguments discussed above with reference to the 35 U.S.C. § 101 rejection, it is respectfully submitted that claim 7 is directed toward patentable subject matter and not merely function alone as the transformation of the signal of an object is deemed otherwise.

The Examiner further states that the Specification does not reasonably provide enablement for a single structural element (or no structural element) performing all of the

claimed functions. (See 12/10/08 Examiner's Answer, p. 7). The Applicants respectfully disagree. The Specification describes the use of the present invention in conjunction with "3D-MR reconstructions or 3D reconstructions derived from X-ray computed tomography." (See, Specification, paragraph [0013]). It is respectfully submitted that the structural elements for obtaining and processing such images are well known to those skilled in the art. Thus, one skilled in the art would readily understand the structural elements included in "[a]n imaging processing system" recited in claim 7.

Thus, it is respectfully submitted that claim 7 is allowable and the Board should overturn the Examiner's rejection.

III. The Rejection Of Claims 1, 4, and 7-9 As Being Unpatentable Under 35 U.S.C. § 102(b) Over Pieper Should Be Reversed.

A. The Examiner's Rejection

In the Final Office Action, the Examiner rejected claims 1, 4, and 7-9 under 35 U.S.C. § 102(b) as anticipated by Pieper. (See 4/14/08 Office Action, p. 7).

Pieper is directed toward an anatomical visualization and measurement system including a first database of 2-D slice images and a second database including a 3-D computer model defining a first software object. (See Pieper, abstract). The system of Pieper takes axial, sagittal or coronal 2-D slice images to construct a 3-D image. (See Id., col. 14, ll. 9-18).

B. The Cited Patent Does Not Disclose Locating an Edge in the Reconstructed Slice, Wherein the Segmenting in the Region of Interest in the One or More Images is Performed on the Basis of the Location of the Edge Found in the Relevant, As Recited In Claim 1.

The Appellants argued in the Appeal Brief that claim 1 recites "locating an edge in the reconstructed slice, wherein the segmenting in the region of interest in the one or more images is performed on the basis of the location of the edge found in the relevant" which is embodied in Fig. 2. Fig. 2 notably shows the slices in the cut plane of the region of interest as shown in the three individual images of Fig. 1. Fig. 2 also shows that the region of interest in the reconstructed slice is clearly separated from image information outside said region of interest. The edges of claim 1 refer to, for example, the distinct edges 22, 23 of the reconstructed slice of

Fig. 2. Accordingly, the portion of Pieper in which the Examiner relies was quoted and nowhere in that disclosure is a locating of an edge or segmenting based on the location of the edge included.

In response to this argument, the Examiner states that the above recitation of claim 1 is the function that Pieper performs. Specifically, the Examiner states “[t]he whole purpose of the invention of Pieper is to create reconstructed image slices in a direction different from the sampled image slices.” (See 12/10/08 Examiner’s Answer, p. 11). It is respectfully submitted that the Examiner read beyond the teachings of Pieper. That is, Pieper does not relate to image slices in a direction different from the sampled image slices. In fact, Pieper relates to reconstructing a 3-D image using 2-D images which are from a common direction. Specifically, the 2-D images are axial, sagittal, or coronal. (See Pieper, col. 14, ll. 9-18). The section further included by the Examiner merely indicates that the standard axial 2-D images is only exemplary and that sagittal or coronal 2-D images may also be used to create the 3-D image. However, in this further portion of Pieper, the previously cited portion of Pieper, and Pieper in its entirety never discloses or suggests “locating an edge in the reconstructed slice,” as recited in claim 1. Furthermore, the reconstructed slice is “set along a cut plane through the multi-dimensional space,” as further recited in claim 1. That is, for example, the cut plane may be perpendicular to the individual images (*e.g.*, the 2-D images of Pieper). Pieper does not disclose or suggest this feature. It appears that the Examiner includes yet another portion of Pieper to address this recitation of claim 1 (*i.e.*, cut plane). In this section of Pieper, a highlighting feature of the periphery of an object is disclosed. However, the periphery that is referred relates to the periphery of the object as it is included in the 2-D image. (See Pieper, col. 15, ll. 48-63). The periphery has no relation to a cut plane nor an edge in the cut plane.

Thus, it is respectfully submitted that Pieper does not disclose or suggest “locating an edge in the reconstructed slice, wherein the segmenting in the region of interest in the one or more images is performed on the basis of the location of the edge found in the relevant,” as recited in claim 1. Accordingly, it is respectfully submitted that claim 1 is allowable and the Board should overturn the Examiner’s rejection for this claim. Because claim 4 depends from and, therefore, includes the limitations of claim 1, it is respectfully submitted that this claim is also allowable.

Claim 7 recites “an edge is located in the reconstructed slice, and the segmentation of the region of interest in the one or more images is performed on the basis of the location of the edge found in the relevant image.” Thus, it is respectfully submitted that this claim is allowable for at least the reasons discussed above with reference to claim 1 and the Board should overturn the Examiner’s rejection for this claim.

Claim 8 recites “locating an edge in the reconstructed slice, wherein the segmenting in the region of interest in the one or more images is performed on the basis of the location of the edge found in the relevant.” Thus, it is respectfully submitted that this claim is allowable for at least the same reasons discussed above with reference to claim 1 and the Board should overturn the Examiner’s rejection for this claim. Because claim 9 depends from and, therefore, includes the limitations of claim 8, it is respectfully submitted that this claim is also allowable.

C. The Examiner Does Not Establish Inherency Regarding the Identification of Edges.

The Appellants argued in the Appeal Brief that claim 1 recites “locating an edge in the reconstructed slice,” and that locating this edge is not inherent in Pieper as the Examiner asserts. In addition to the legal precedence discussed in the Appeal Brief, a further clarification of why the Examiner fails to establish inherency will be discussed.

The Examiner replies to the establishment of inherency by posing a question: “how does Pieper identify structures in the 3D reconstructed images without edge?” (See 12/10/08 Office Action, p. 12). Accordingly, because it is impossible to identify a structure without identifying edges, the identification of edges in Pieper is inherent. (See Id.). However, it is respectfully submitted that the Examiner’s inherency argument is still misplaced.

Claim 1 recites “locating an edge in the *reconstructed slice*.” As further recited in claim 1, the reconstructed slice is “set along a cut plane through the multi-dimensional space.” Pieper does not necessitate the use of edges in a *reconstructed slice*, in particular one that is “set along a cut plane through the multi-dimensional space.” Pieper takes 2-D slices in an axial, sagittal, or coronal direction. The periphery of the object on each 2-D slice is used to generate the 3-D object. There is no further disclosure or suggestion or inference that a reconstructed slice or an edge of the reconstructed slice being used to reconstruct the 3-D image.



Thus, it is respectfully submitted that claims 1, 4, 7-9 are allowable for least these further reasons. It is also noted that in light of the above clarification, it appears that the Examiner is using impermissible hindsight as part of the inherency argument. Without knowledge of the present application, no conclusion may be drawn from the disclosure of Pieper regarding the edge of the reconstructed slice.

IV. The Rejection of Claims 5 and 6 Under 35 U.S.C. § 103(a) Over Pieper In View of Han Should Be Reversed.

A. The Examiner's Rejection

In the Final Office Action, the Examiner rejected claims 5 and 6 under 35 U.S.C. § 103(a) as being unpatentable over Pieper in view of Han. (See 4/14/08 Office Action, p. 10).

Han is directed toward a method for extracting the edge boundary of an object presented as an ultrasound video image, in particular the edge boundary of the LV of the heart, which includes preprocessing algorithms, contour extraction algorithms and knowledge based contour following algorithms. (See Han, Abstract).

B. The Cited Patents Do Not Disclose Locating an Edge in the Reconstructed Slice, Wherein the Segmenting in the Region of Interest in the One or More Images is Performed on the Basis of the Location of the Edge Found in the Relevant, As Recited In Claim 1.

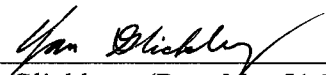
As discussed above, Pieper does not disclose or suggest “locating an edge in the reconstructed slice, wherein the segmenting in the region of interest in the one or more images is performed on the basis of the location of the edge found in the relevant,” as recited in claim 1. Han also does not disclose or suggest this recitation of claim 1. Thus, neither Pieper nor Han, either alone or in combination, discloses or suggests this recitation of claim 1. Because claims 5 and 6 depend from and, therefore, include all the limitations of claim 1, it is respectfully submitted that these claims are also allowable.

5. Conclusion

For the reasons set forth above, Appellants respectfully request that the Board reverse the rejection of the claims by the Examiner under 35 U.S.C. §§ 101, 102(b), and 103(a), and indicate that claims 1 and 4-9 are allowable.

Respectfully submitted,

Date: August 3, 2009

By:   
Yan Glickberg (Reg. No. 51,742)

**CLAIMS APPENDIX**

1. (Previously Presented) A method for processing images, in which individual images succeed one another in a direction of succession, the method comprising:  
constructing a multi-dimensional data set from the individual images,  
wherein the multi-dimensional data set assigns data values to positions in a multi-dimensional space, and the multi-dimensional space is set up by the direction of succession and two directions parallel to the surface of the individual images,  
reconstructing a slice through the multi-dimensional data set along a cut plane through the multi-dimensional space,  
segmenting a region of interest from the one or more relevant images is performed in one or more of the individual images, wherein the segmenting is performed on the basis of information in the reconstructed slice along the cut plane through the multi-dimensional data set,  
locating an edge in the reconstructed slice, wherein the segmenting in the region of interest in the one or more images is performed on the basis of the location of the edge found in the relevant, wherein  
the direction of the cut plane has a component in the direction of succession, and in which a region of interest is located on the basis of the cut plane.

2-3. (Cancelled)

4. (Previously Presented) A method of processing images as claimed in claim 1, in which respective slices through the multi-dimensional data set are reconstructed along a plurality of cut planes through the multi-dimensional space, and  
the directions of the individual cut planes have components in the direction of succession,  
individual edges are tracked in the individual slices,  
and the segmentation of the region of interest in the one or more images is performed on the basis of the individual locations of the respective edges found in the relevant image.

5. (Original) A method of processing images as claimed in claim 4, in which a boundary of the region of interest is derived by interpolation between the individual locations in the relevant image of the respective edges found.

6. (Original) A method of processing images as claimed in claim 5, in which the interpolation is performed inter alia on the basis of a priori information concerning the region of interest.

7. (Previously Presented) An image processing system that is arranged to process individual images that succeed one another in a direction of succession, and to reconstruct a multi-dimensional data set from the individual images,

which multi-dimensional data set assigns data values to positions in multi-dimensional space,

which multi-dimensional space is set up by the direction of succession and two directions parallel to the surface of the individual images,

to reconstruct a slice through the multi-dimensional data set along a cut plane through the multi-dimensional space, and to segment a region of interest from the one or more relevant images is performed in one or more of the individual images, wherein: the segmentation is performed on the basis of information in the reconstructed slice along the cut plane through the multi-dimensional data set; an edge is located in the reconstructed slice, and the segmentation of the region of interest in the one or more images is performed on the basis of the location of the edge found in the relevant image; and the direction of the cut plane has a component in the direction of succession, and to locate a region of interest on the basis of the cut plane.

8. (Previously Presented) A computer readable medium storing a computer program with instructions for processing individual images that succeed one another in a direction of succession, and for

reconstructing a multi-dimensional data set from the individual images,

which multi-dimensional data set assigns data values to positions in a multidimensional space,

which multi-dimensional space is set up by the direction of succession and two directions parallel to the surface of the individual images,  
reconstructing a slice through the multi-dimensional data set along a cut plane through the multi-dimensional space,  
segmenting a region of interest from the one or more relevant images is performed in one or more of the individual images, wherein the segmenting is performed on the basis of the information in the reconstructed slice along the cut plane through the multi-dimensional data set, locating an edge in the reconstructed slice, wherein the segmenting in the region of interest in the one or more images is performed on the basis of the location of the edge found in the relevant, wherein  
the direction of the cut plane has a component in the direction of succession, and for locating a region of interest on the basis of the cut plane.

9. (Original) A medical diagnosis workstation that is provided with an image processing system as claimed in claim 7, for example, programmed by way of a computer program as claimed in claim 8.